

Exercise 2

2a

```
figure  
I = imread('peppers.png');  
imshow(I)
```



2b

Blur Gaussian filter

```
h = 1/256*[1 4 6 4 1; 4 16 24 16 4; 6 24 36 24 6; 4 16 24 16 4; 1 4 6 4 1];  
If = imfilter(I, h, 'conv', 'circular');  
imshow(If);
```



Motion filter

```
h = zeros(9, 9);
for i = 1:length(h)
    h(i, i) = 1;
end
h = h/sum(sum(h));
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



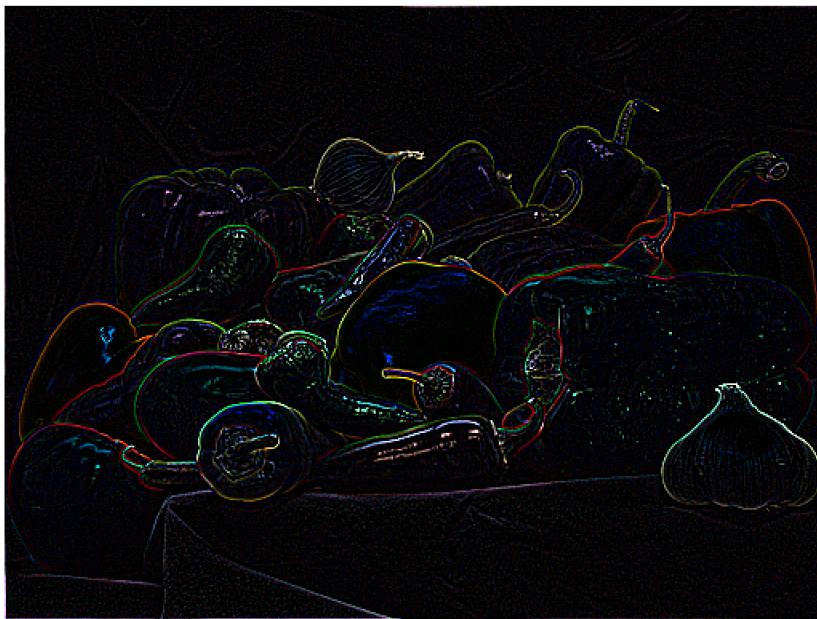
Sharpening

```
h = [-1 -1 -1; -1 9 -1; -1 -1 -1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



Edge detection

```
h = [-1 -1 -1; -1 8 -1; -1 -1 -1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



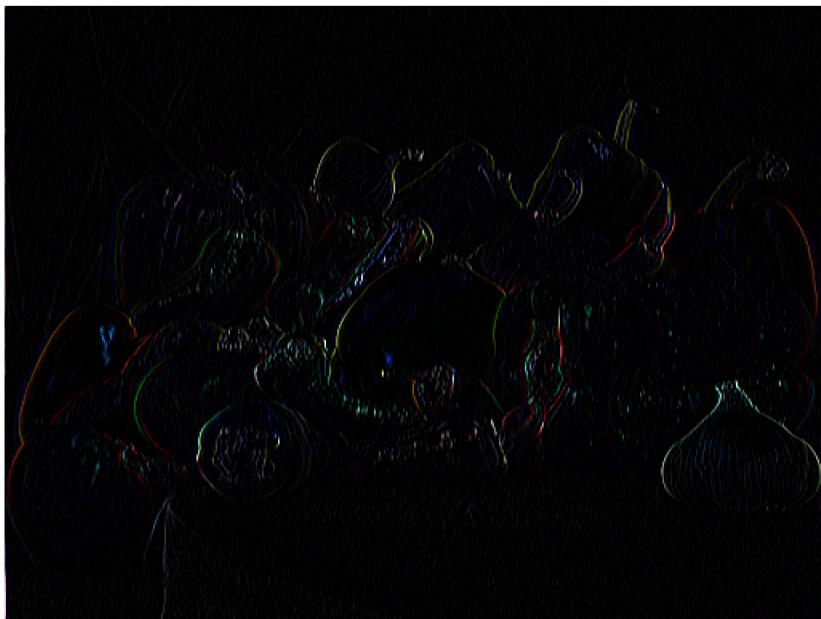
Horizontal line detection

```
h = [-1 -1 -1; 2 2 2; -1 -1 -1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



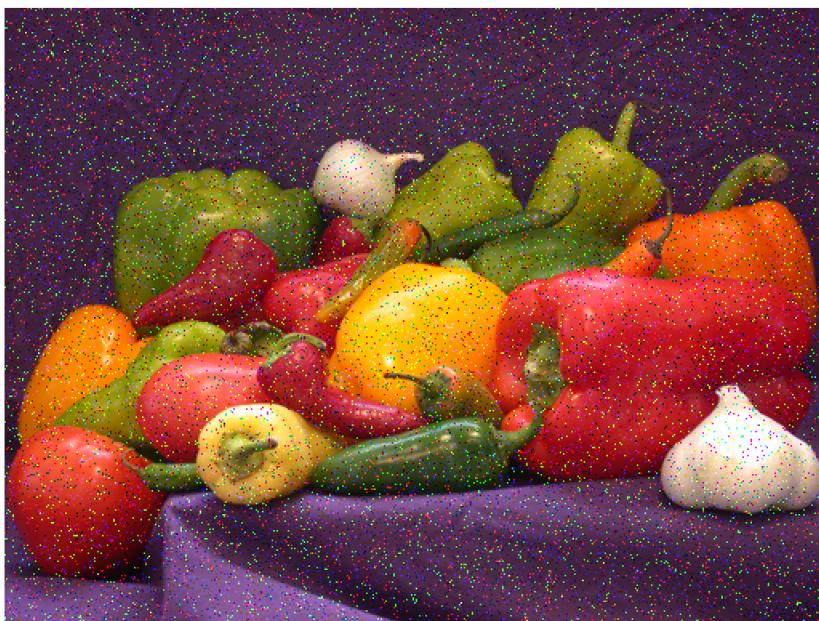
Vertical line detection

```
h = [-1 2 -1; -1 2 -1; -1 2 -1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



2c

```
If2 = imnoise(I, 'salt & pepper');
imshow(If2);
```



2d

```
imwrite(If, 'photo1_noise', 'jpg')
```

2e

```
h = 1/9*[1 1 1; 1 1 1; 1 1 1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```



% The image becomes brighter if we increase the filter size

```
h = 1/9*[1 1 1; 1 1 1; 1 1 1];
If = imfilter(I, h, 'conv', 'circular');
imshow(If);
```

